UNIVERSITY OF
ILLINOIS LIBRARY
AT URBANA-CHAMPAIGN
BOOKSTACKS

Digitized by the Internet Archive
in 2011 with funding from
University of Illinois Urbana-Champaign

http://www.archive.org/details/canincreasedinte91165frie

FACULTY WORKING PAPER 91-0165

330
B385
1991:165 COPY 2
STX

Can Increased Intermediation Impede Growth? -- Revised

The Library of the
NOV 1 6 1991
University of Illinois
of Urbana-Champaign

Jorge R. Friedman
U.C. Berkeley and
ILADES/Georgetown

William F. Maloney
Department of Economics
University of Illinois

Bureau of Economic and Business Research
College of Commerce and Business Administration
University of Illinois at Urbana-Champaign

BEBR

FACULTY WORKING PAPER NO. 91-0165

College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

September 1991

Can Increased Intermediation Impede Growth? -- Revised

Jorge R. Friedman
U.C. Berkeley and
ILADES/Georgetown

William F. Maloney
Department of Economics
University of Illinois

Can Increased Intermediation Impede Growth? *

Jorge R. Friedman
U.C. Berkeley and
ILADES/Georgetown

William F. Maloney
Univ. of Illinois
Urbana-Champaign

June 11, 1991

The regulation of intertemporal consumption decisions may be as critical a function of a growth promoting financial sector as the efficient allocation of savings between investment projects usually cited. Using standard analytics the paper begins by establishing the possible incompatibility of pareto optimality and growth. It then demonstrates using a two period dynamic model in a Nash framework that in an economy where agents earn their incomes from differing endowments of labor and capital, increases in investment by "capitalists" will be partially offset by an increased desire for consumption by wage earners. It follows that development policies designed to increase capital accumulation will be frustrated by this offset, and that a sudden liberalization of consumption borrowing may result in dramatic falls in savings rates. The paper draws on experience from Europe, the U.S., Japan, and Chile.

* Our appreciation to Salim Rashid for comments on previous drafts.

I. INTRODUCTION

The literature on financial liberalization has focused primarily on how increased intermediation leads to more efficient allocation of savings between investment projects and thus promotes growth.[1] It is less often noted that freeing capital markets also permits agents to smooth consumption patterns over time more easily. While, like the investment allocation effect, this neglected intertemporal smoothing effect of liberalization represents a movement toward greater efficiency, we argue that its implications for growth are likely to be adverse.

Using relatively simple analytics, we begin by showing that unrestricted "intertemporal trade" can be growth reducing under a variety of assumptions about technology, endowments and agents' preferences that are by no means pathological. Put differently, pareto optimality and growth can be incompatible objectives. The core of the paper then demonstrates the existence of a savings reducing "externality" arising from the accumulation process itself. In the absence of institutional constraints on consumer borrowing, this externality is likely to impede growth. In an economy where otherwise identical agents earn their income from differing endowments of labor and capital, increases in investment by rent-earners (capitalists) will be partially offset by a desire to consume against future income by wage earners who see both a rise in the marginal product of their labor and a fall in the return to investment (savings). This savings offset which we term "consumption crowding out" will frustrate development policies designed to increase capital accumulation. Regulating intertemporal consumption decisions may therefore be a critical function of a growth promoting financial sector.

The current world-wide concern with liberalizing financial sectors and with deficient rates of savings makes the results we derive more than theoretical curiosities. Numerous studies have now documented declining savings rates concomitant with the release of constraints on consumer and mortgage borrowing. Lehmussaari (1991), reports dramatic falls in net savings as a percent of net disposable income in Denmark from 13.3% in 1984 to 4.1% in 1986 and in Norway from 9.5% to -1.8% across the same period, attributable partly to "the release in pent up household credit demand,

---

[1] See Fry (1980, 1982,1989), Galbis (1977), McKinnon (1973, 1976) for discussion of how financial liberalization may enhance average productivity of investments.

primarily for durable goods and real and financial assets, brought about by the end of [credit] rationing."[2] Bouvenberg and Evans (1990) explain part of the fall of U.S. personal savings from 5.3% to 3.4% from 1980-89, again, by increased consumer access to financial markets allowing them to smooth consumption and reduce the need for target savings required for purchases of major consumer durables.[3] A recent OECD study (Dean et al, 1990) finds the rapid build up of gross personal debt in recent years in the U.S., U.K., Australia, Sweden, Finland and Norway "closely related to an easing of borrowing constraints associated with significant financial market liberalization and innovation."[4]

It is likely that the institutional barriers to borrowing now being removed in the U.S. and Europe have been as critical to East Asia's high savings rates as the frequently invoked cultural characteristics. The Japanese case is illustrative. The existence of **Sarakin** (informal credit markets) [5] exhibiting very high real interest rates suggests that central bank policies restricting consumer and mortgage borrowing were binding and that demand existed for credit that would have competed for investment resources critical to the accelerated growth strategy the country pursued.[6] The recent surge in Japanese consumer spending has been attributed partly to the spending of savings which, in the absence of mortgage finance, were accumulated for future housing purchases now made infeasible by astronomical real estate values.[7] The suggestion by the Japanese representative at the April 1990 bilateral trade talks that the U.S. restrict consumers to only two credit cards represents the logical extension of consumer credit rationing to managing balance of payments deficits.

Evidence for our second effect, that a perceived increase in capitalist investment and hence future income may decrease worker savings, is preliminary but also provocative. In the U.S. a consistent inverse relation between corporate and personal savings has become known as "Denison's Law" of constant private savings as a fraction of GNP (Denison 1958). David and Scadding (1974)

---

[2] Lehmussaari (1990a) p 16.

[3] Bovenberg (1990) p. 11.

[4] Dean, et. al (1990) p. 42.

[5] In the high growth period of the 1970's, the share of installment mortgage and consumer credit in GNP totaled 17.5% compared to 70.1% in the U.S.. Sakakibara and Feldman (1983).

[6] Feldman (1985), Suzuki (1986), Cargill and Royama (1988), Greenwood (1988).

[7] *The Economist*, September 9, 1989.

confirmed Denison's work for the 1868-1968 period and in addition documented a secular shift away from personal savings toward corporate savings within gross savings. On the assumption that corporate saving is capitalist saving both patterns are predicted by our model.

The Chilean liberalization experiment of the 1970's provides a more dramatic example. After three years of rapid GDP growth following extensive structural reforms, national savings plummeted to a historic low in 1981 [8] concomitant with a volcanic surge in consumer borrowing.[9] Graph 1 indicates that increases in real consumer borrowing of up to 22% **per month** was associated with the sharp rise in real interest rates to over 40%, far above any feasible return to productive capital. Several Chilean economists [10] find the source of this consumption boom in the reigning ambiance of "triumphalism" or the conviction that Chile had overcome a decade of stagnation and "in ten years would be a developed nation... where 70% of the population would have color TV's." [11] This feeling was only heightened by the vast inflows of capital from abroad that made tangible the international community's praise for Chile as a growth miracle. That a desire to consume against this brighter future reduced available savings, increased competition for investable resources and ultimately helped undermine the reform effort is, perhaps to an exaggerated degree, exactly the "consumption crowding out" effect we have in mind. [12] We are not arguing that other reasons for high interest rates during this period such as desperation borrowing by firms, speculative borrowing for real estate or financial assets, expectations of devaluation, or monetary contraction, are not important, but only that

---

[8] The government was running a budget surplus during this period.

[9] Compare the rise in consumer borrowing as a share of total bank lending in 1981 alone from 8.1% to 11.3 in one year to the rise from 5.7% to 8% in Japan for the entire decade 1975-85.

[10] Zahler (1985), Schmitt-Hebel (1987), Barandiaran (1987), Eyzaguirre (1988). Corbo (1985) focuses more on perceived increases in wealth, particularly due to the stock market boom.

[11] Labor Minister Jose Piñera to 3,000 union leaders, 1980. Also of interest was Minister of the Treasury Sergio de Castro's 1980 state of the economy speech. " The chart indicates a change which few will dare not to recognize. The economy is growing in such a way that in 11 years income per capita will double in contrast to past circumstances where this would have been achieved only after 46 years of waiting. Taken from Eyzaguirre (1988).

[12] Dornbusch (1985) has suggested that consumption of imports represents a form of speculation against the peso that was expected to devalue soon. Such expectations seem improbable given that no black market emerged, capital inflows remained strong and reserves increased until end 1981. Even if evidence of expected devaluation were clear, that Chileans would speculate in household appliances and breeding stock instead of more orthodox forms of capital flight familiar to Latin America also seems unlikely. The increase in imports, like the increase in consumption of consumer durables and boom in real estate, is probably better explained by an excessive faith in the government's model, rather than the reverse.

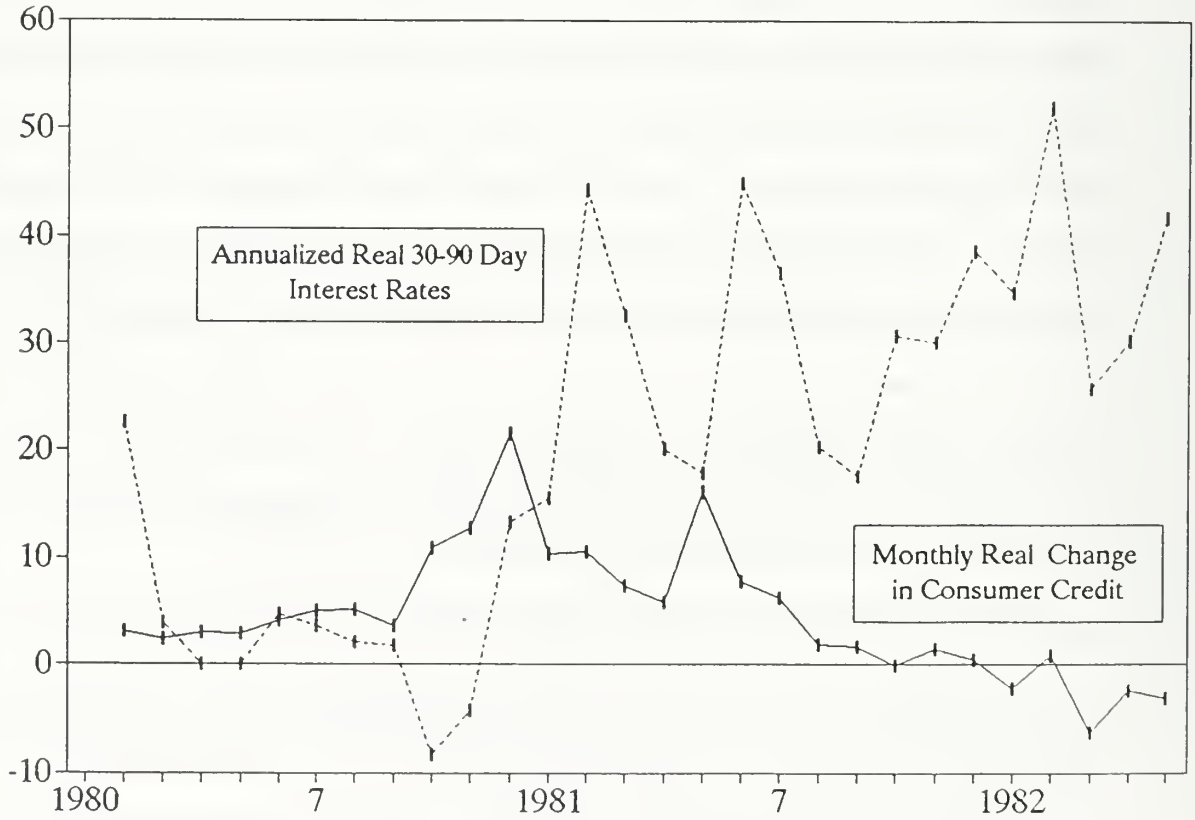
CHILE: Indicators of Consumption Borrowing and Spending

	1977	1978	1979	1980	1981	1982
GDP Growth 1/	9.4	9.6	9.9	9.7	5.4	-15.1
Private Consumption as % GDP 2/	71.8	72.3	71.1	70.5	76.2	76.1
Consumer Durables Sales Index 3/	79.0	92.0	97.0	124.0	130.0	71.0
National Savings as % GNP 4/	8.7	8.2	11.7	13.7	5.3	.4
National Savings as % GNP 5/	10.2	10.6	13.5	15.8	7.3	2.6
Consumer Borrowing as % Total 6/	N/A	N/A	6.0	8.1	11.3	N/A
As % 1979 Borrowing	N/A	N/A	6.0	15.9	30.8	N/A

1/ Corbo(1985), 2/, 3/ Banco Central de Chile, *Boletin Mensual*, 4/Economic Commission for Latin America, 5/ Oficina de Planificacion Nacional, 6/ Superintendencia de Bancos.

Graph 1

Chile: Consumer Credit, Interest Rates



the boom in consumption borrowing seems a hitherto neglected but empirically significant influence that our model can explain.

Both theory and experience, then, suggest a tension between pareto optimality and growth that seems to present policy makers with a difficult normative judgement of how much to regulate consumption. The conflict is probably more apparent than real. Because of the impossibility of incorporating future generation's preferences over the present capital stock, the market handles intergenerational welfare questions with difficulty and only in a tautological sense generates an "optimal" level of savings. It is possible to imagine an efficient outcome where rational actors concerned only with themselves consume the entire capital stock and leave nothing to posterity. Under these circumstances, a social planner maximizing a welfare function that includes the yet unborn might choose to intervene. Even if agents do consider the well-being of future generations, Sen (1984) argues that their sacrifice of consumption may not be justified unless the entire generation does the same. In this case, restrictions on consumption smoothing could be seen as a mechanism of coordination, in the same way that mandatory education and accompanying deferral of leisure and income is perceived to carry compensating social benefits despite its compulsory nature.

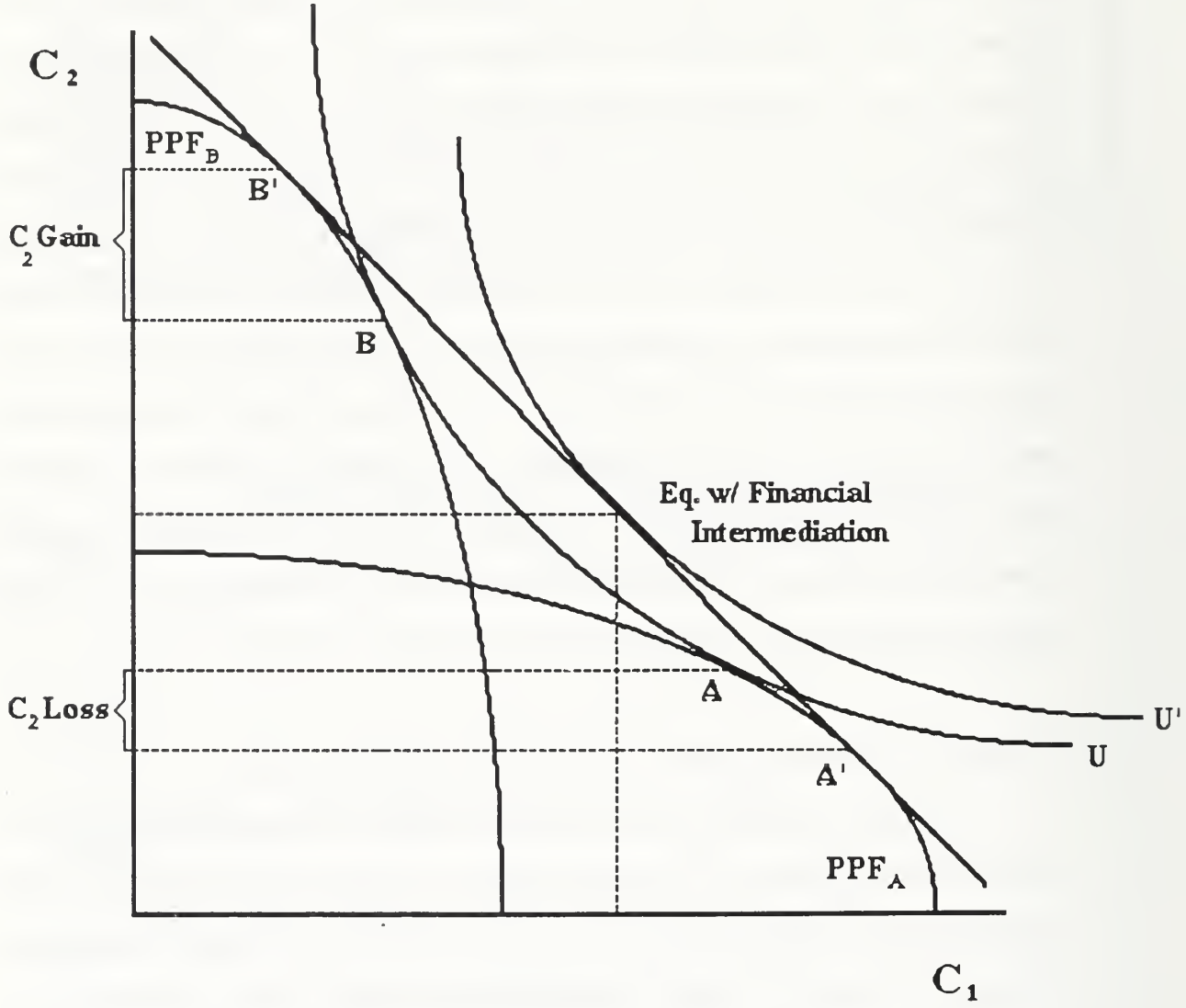
II. FINANCIAL INTERMEDIATION

The literature frequently assumes a unitary representative agent, the archetypal capitalist, or multiple agents with homogenous preferences who allocate an initial endowment across time subject to expected returns to investment. However, only with differentiation of actors either in endowments, technology or preferences are there gains from financial intermediation. Drawing on relatively simple analytics, it is straightforward to illustrate the efficiency gains on which McKinnon based his advocacy of increased intermediation through the financial sector. These efficiency gains he saw as critical to economic development which he defined as "reducing the great dispersion in social rates of return to investment" visible in most LDC's.[13] Graph 2 shows how both the efficiency of capital and the

---

[13] McKinnon (1973) p.9.

Graph 2
Financial Intermediation with
Differing Technologies



welfare of two identical agents facing different technologies or endowments can be enhanced by "intertemporal trade." It is also clear that this pareto improvement does not necessarily imply higher levels of growth. Depending on the preferences of our identical individuals and the particular technologies, the losses in second period consumption, C_2 may exceed gains.

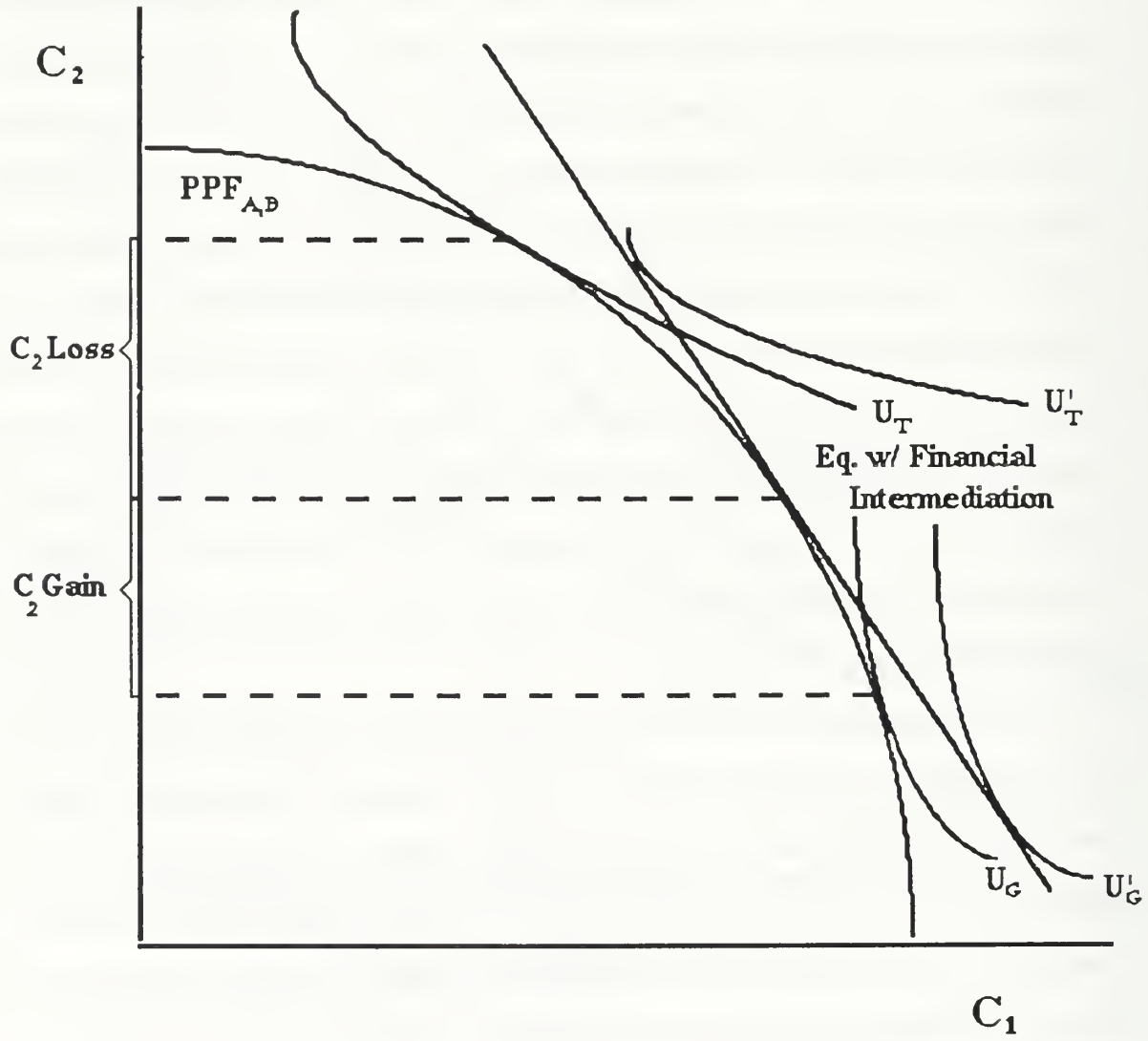
A case more relevant to our argument is that of a thrifty agent with strong preference for second period consumption and a greedy agent favoring consumption this period facing identical technologies. Again, as Graph 3 shows, intermediation allows both agents now reach a higher level of utility but the quantity of second period consumption, C_2 may fall. This effect becomes more dramatic with the introduction of a second period endowment or more generally, an alternative source of income to capital rents. As Graph 4 shows, our greedy agent can now dissave. In arguing for greater intermediation, we generally envision only the isolated entrepreneur now able to realize investment plans because of increased access to credit. Just as easily, however, we may find consumers with rates of subjective time preferences exceeding any feasible return to capital now competing for investible resources who previously would have been forced to live within their means each period.[14] Increased financial intermediation in this context may lead to a pareto superior outcome, but may not deliver the higher growth rates promised.

The model presented in the next section shows how in the normal process of capital accumulation a class of greedier actors with second period "endowments" naturally arises. Within a general equilibrium framework we add to our archetypal capitalist a second actor with **identical** preferences who derives his second period income not only from capital rents on first period consumption deferred, but also from returns to his labor, effectively a second period endowment. His optimal, rational behavior will tend to offset increases in investment by capitalists because of a resulting double disincentive to savings: a fall in the marginal return to first period consumption

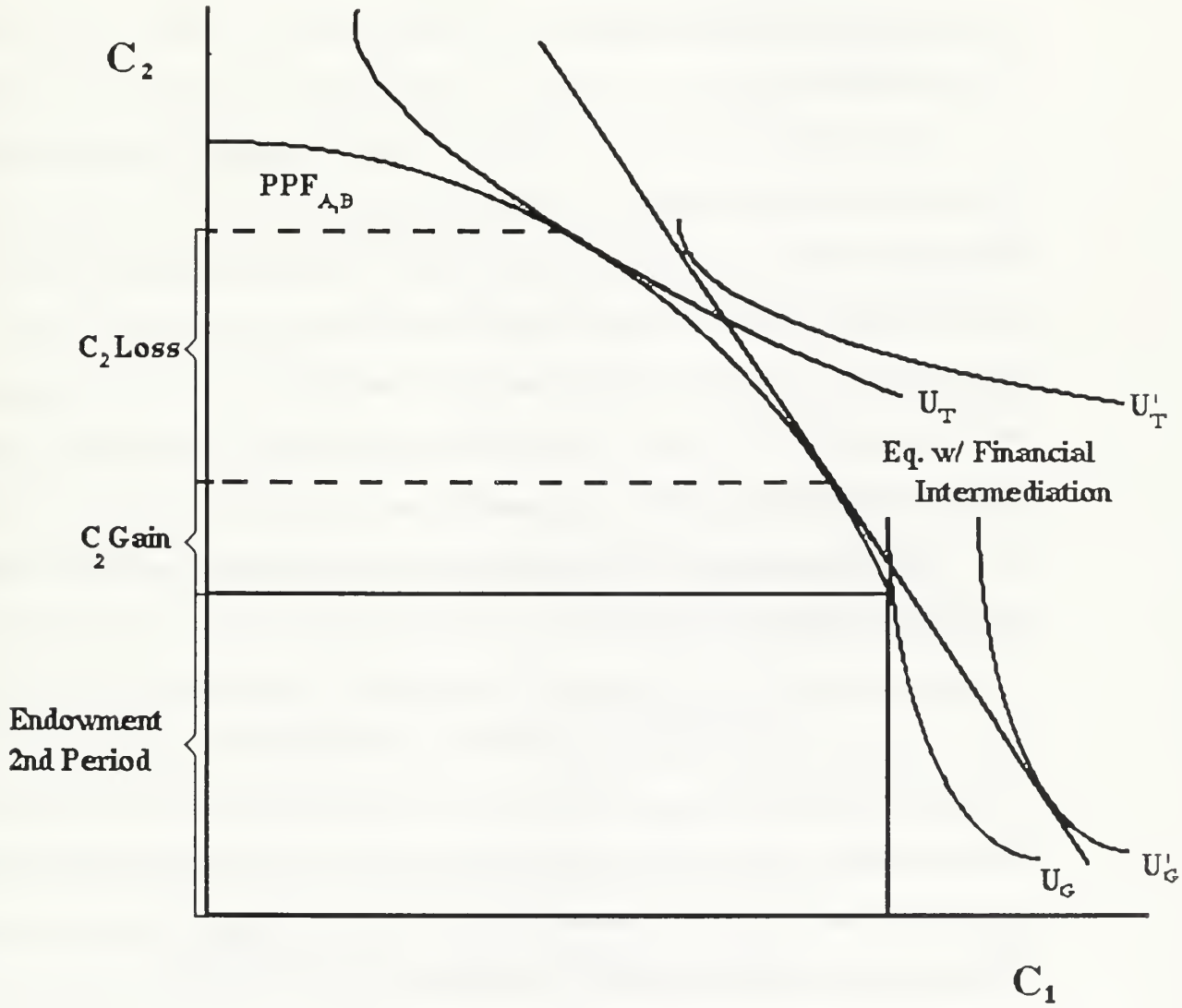
---

[14] Thaler and Shefrin (1981) cite estimates of subjective rates of discount between 25-122%, far above a relevant rate of interest. They argue that self-imposed or institutionally imposed borrowing constraints such as Christmas clubs or bonus pay schemes in Japan serve to keep savings rates higher than would be expected given estimated SRD's.

Graph 3
Financial Intermediation with
Differing Preferences



Graph 4
Financial Intermediation with
Differing Preferences and
2nd Period Endowment



deferred and an expected rise in future income from wages. We further argue that in situations where consumer access to markets has historically been denied, an accumulated repressed demand for consumption credit may suddenly compete with investors upon liberalization of financial markets that may lead to a substantial fall in savings and net investment that dwarfs expected efficiency gains.

III. A DYNAMIC TWO AGENT MODEL

A. The General Case

Our economy is populated by two representative agents who live for two periods and differ only in initial endowments of capital and labor. They either consume or invest the single good in period one and consume everything in the second period. The agents exhibit identical utility and perfect foresight, but derive their income in different proportions from capital and from wages. The agents' decisions to accumulate capital or consume are interdependent since both depend on the marginal product of the total stock of capital which includes investment of both labor and capital. Following Sargent (1987) we derive the Nash equilibrium.

We assume an aggregate well behaved production function exhibiting constant returns to scale in its two inputs, capital (K) and labor (L).

$$Q = F(K,L): \; f(0) = 0, \; f(\infty) = \infty, \; f' > 0, \; f'(\infty) = 0 \tag{1}$$

Labor (L) supplies L units of labor in period 1 and period 2 and begins with no capital but can accumulate K_{1L} during period 1 by consuming less than it earns. The Capitalists (K) possess no labor, K_0 units of capital and may accumulate in the same manner K_{1K}. Both are also subject to the constraints:

$$F(K_0,L) = C_{1K} + K_{1K} + C_{1L} + K_{1L} \tag{2}$$

Total first period output goes either into first period consumption by labor or capitalists (C_{1K},C_{1L}) or investment (output carried over to period 2) by labor or capitalist (K_{1K},K_{1L}) and

$$F(K_1,L) = C_{2K} + C_{2L} \tag{3}$$

Second period output is consumed by capitalists C_{2K} or labor C_{2L}. Both agents maximize their identical intertemporal utility functions in first and second period consumption C_{1i} and C_{2i} and the subjective rate of time preference ß.[15]

$$U(C_{1i}) + \beta U(C_{2i}) \qquad i = \{K,L\} \tag{4}$$

$$U' > 0, \quad U'' < 0, \quad U'(0) = \infty, \tag{5}$$

given L and K_0 **and the investment choices of the other agent.** Given K_{1L}, each choice of K_{1K} will imply a different C_{1L} and that given K_{1K}, each choice of K_{1L} will imply a different C_{1K}. Our particular version of a Nash equilibrium will assume that labor takes capital's actions as given and beyond its influence and vice versa. Both agents seek to maximize their consumption with respect to their investment in period 1 conditioned on the other agents decision which allows the first and second period material balance equations to serve as budget constraints. Combining equations (2) and (3) with the standard Euler equation gives symmetrically for each:

$$U'[F(K_0,L) - K_{1i} - C_{1j} - K_{1j}] = \beta U'[F(K_1,L) - C_{1j}]*F'_{K,2} \tag{6}$$

---

[15] It has been established that for the kinds of problems we are studying the maximization problem the planner faces is identical to the one each a representative consumer faces, thus the solutions reached by the planner or the single agent are equal (a presentation of this can be found in Milton Harris, 1987). We can restrict the analysis to the problem the planner faces without loss of generality.

where $F'_{K,2}$ is the marginal product of capital in period two given the capital stock carried over, $K_1 = K_{1K} + K_{1L}$. To find the consistent equilibrium we derive the reaction functions $K_{1K}(K_{1L})$, $K_{1L}(K_{1K})$ for both capitalists and labor. At the Nash solution each set of agents is behaving optimally given the other's actions.

1. Derivation of the Investment Reaction Function for Capitalists

Assigning to each agent his marginal product implies that capital's second period consumption is

$$F(K_1,L) - C_{1L} - K_{1K} * F'_{K,2} \tag{7}$$

and we can rewrite equation (6) as

$$U'[F(K_0,L) - K_{1K} - C_{1L} - K_{1L}] = U'[K_{1K} * F'_{K,2}] * F'_{K,2} \tag{8}$$

An additional unit of investment by labor lowers next period's return on investment $F'_{K,2}$ This lowers both capital's income next period and return on investment. The income effect makes capitalists increase investment to equalize the marginal utility of tomorrow's income with today's while the substitution effect lowers it by making investment less profitable. We will assume, as is common in the literature, that the substitution effect dominates.

2. Derivation of the Investment Reaction Function for Labor

Labor's problem differs critically because workers receive income not only from savings (investment) that it carries from period 1 to 2, but also from wages, the marginal revenue product of labor. Therefore

$$F(K_1,L) - C_{1K} = K_{1L}*F'_{K,2} + L*F'_{L,2} \tag{9}$$

and we can rewrite equation 8 as

$$U'[F(K_0,L) - K_{1L} - C_{1K} - K_{1K}] = \beta U'[K_{1L}*F'_{K,2} + L*F'_{L,2}]*F'_{K,2} \tag{10}$$

Investment by the capitalists brings about an increase in $F'_{L,2}$ and a fall in $F'_{K,2}$ which increases labor's income next period and lowers next period's return on investment. Assuming that labor's second period income (LHS term in brackets) is more affected by the former effect than the latter, then both effects of capital's investment together **unequivocally** reduce labor's investment:

$$\frac{\delta K_{1L}}{\delta K_{1K}} < 0 \tag{11}$$

This offsetting behavior by labor is the effect we desire to contrast to the case of homogenous agents, where investment by one implies investment by all. It is emphatically not the case that people are myopic and do not see that their future income is contingent on their rate of savings now nor is it an externality in the strict sense of the term. Rational agents, observing increased investment by capitalist upgrade their estimate of next period's incomes and consume more now.

B. Nash Solution with Cobb-Douglas Production Function and Logarithmic Utility Function

Employing Cobb-Douglas Technology and logarithmic utility yields particularly transparent reaction functions and permits simple graphical analysis. Let

$$F(K,L) = K^{\alpha}L^{1-\alpha} \tag{12}$$

and

$$U(C) = \log(C). \tag{13}$$

1. Optimal Investment Reaction Function for Capitalists

Equation (6), the Euler equation for the capitalists, now has the form

$$C_{1K} = \frac{C_{2K}}{\beta\alpha K_1^{\alpha-1}L^{1-\alpha}} \tag{14}$$

As before, in the first period capitalists consume the residual of investment by both actors and consumption by labor

$$C_{1K} = [K_0^{\alpha}L^{1-\alpha} - K_{1K} - C_{1L} - K_{1L}] \tag{15}$$

and in the second, both the return and their actual capital.

$$C_{2K} = K_{1K}*F'_{K2} = K_{1K}*\alpha K_1^{\alpha-1}L^{1-\alpha} \tag{16}$$

Equation (14) can now be re-written as

$$[K^{\alpha}L^{1-\alpha} - K_{1K} - C_{1L} - K_{1L}] = \frac{K_{1k}*\alpha K_1^{\alpha-1}L^{1-\alpha}}{\beta\alpha K_1^{\alpha-1}L^{1-\alpha}} \tag{17}$$

which implies that

$$K_{1K} = \frac{\beta}{(1+\beta)} * [K_0^{\alpha} L^{1-\alpha} - C_{1L} - K_{1L}] \tag{18}$$

and that

$$\frac{\delta K_{1K}}{\delta K_{1L}} = \frac{\beta}{(1+\beta)} * \left[-\frac{\delta C_{1L}}{\delta K_{1L}} - \frac{\delta K_{1L}}{\delta K_{1L}} \right] = 0 \tag{19}$$

Note that $\delta C_{1L}/\delta K_{1L}$ is equal to -1 because every unit labor invests in period 1 must be matched with an equal reduction in their consumption that period. $\delta K_{1K}/\delta K_{1L} = 0$ implies that under the current specifications of the production and utility functions, investment of capitalists does not depend in the investment pattern of labor. This is reflected in Graph 5 as the vertical line R^K. The decrease in $F'_{K,2}$ resulting from an increase in investment by labor that might lead to an increase in consumption in period 1 is exactly offset by the increase in utility resulting from the fall in income in period 2.

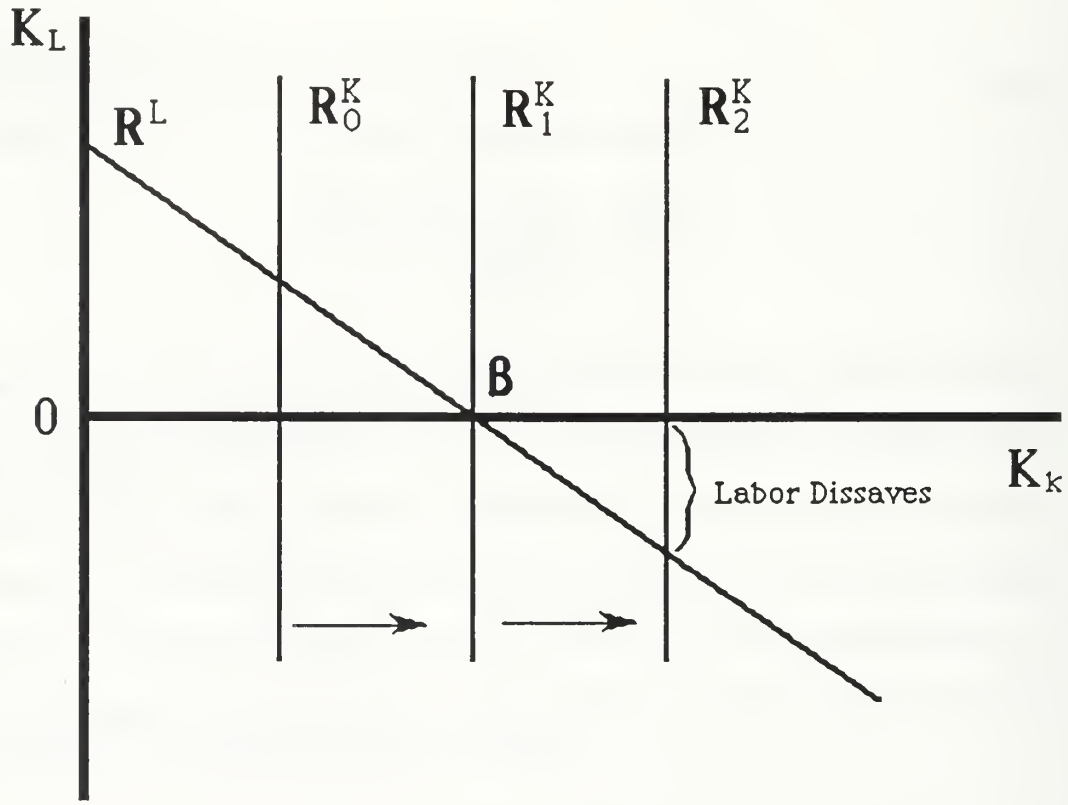
2. Optimal Investment Reaction Function for Labor

An almost identical derivation yields the reaction function for labor. The Euler equation

$$C_{1L} = \frac{C_{2L}}{\beta \alpha K_1^{\alpha-1} L^{1-\alpha}} \tag{20}$$

combined with

Graph 5
Nash Equilibria
Reaction Functions for Labor and Capital



R^L --Reaction function for Labor

R^K --Reaction functions for Capital

$$C_{1L} = [K_0^{\alpha} L^{1-\alpha} - K_{1L} - C_{1K} - K_{1K}] \tag{21}$$

$$C_{2L} = [K_{1L} * F'_{K2} + L * F'_{L2}] = [K_{1L} * \alpha K_1^{\alpha-1} L^{1-\alpha} + L * (1-\alpha) K_1^{\alpha} L^{-\alpha}] \tag{22}$$

can be re-written as

$$[K_0^{\alpha} L^{1-\alpha} - K_{1L} - C_{1K} - K_{1K}] = \frac{[K_{1L} * \alpha K_1^{\alpha-1} L^{1-\alpha} + L * (1-\alpha) K_1^{\alpha} L^{-\alpha}]}{\beta(\alpha K_1^{\alpha-1} L^{1-\alpha})} \tag{23}$$

which implies that

$$\beta[K_0^{\alpha} L^{1-\alpha} - K_{1L} - C_{1K} - K_{1K}] = K_{1L} + \frac{(1-\alpha)K_1}{\alpha}$$

or

$$K_{1L} = \frac{\alpha}{(\beta\alpha+1)} * \left[\beta K_0^{\alpha} L^{1-\alpha} - C_{1K} - \frac{K_{1K}}{\alpha}\right] \tag{25}$$

Noting that $\delta C_{1K}/\delta K_{1K} = -1$ we get:

$$\frac{\delta K_{1L}}{\delta K_{1K}} = \frac{\alpha-1}{\beta\alpha+1} < 0. \tag{26}$$

This algebraically confirms our previous intuition that for labor the combined effect of a decrease in returns from capital and increase in the wage is negative, and the resulting reaction function, depicted as line R^L in Graph 5, must have a negative slope. Labor can invest all of its period 1 earnings or

earnings or can incur consumption debts which they pay off in period 2 with wages received *even if they invest nothing in period 1.*

3. Equilibrium

The intersection of R^L and R^K defines the unique Nash equilibrium. It is immediately apparent that labor saves (invests) less as capital saves (invests) more and that there exists a level of investment by capitalists sufficiently large, at point B, that labor's optimal reaction is to invest zero and beyond this point, to borrow against future earnings.

Investment increasing policies, be they increasing foreign aid, liberalization of the financial sector, or tax reforms, that seek to promote investment or shift the R^K line to the right are bound to be frustrated to the degree that workers react by reducing their savings or by borrowing to consume, represented by the slope of R^L. This can be shown to be less than 45° independent of the specific formulation of the production and utility functions so investment can never be more than "crowded out" though it could be completely offset. From equation (26) we see that the offset effect under Cobb-Douglas technology falls in absolute value as capital share in output rises. Intuitively, this makes sense since the larger the share of output is paid in wages, the more savings will vary with a change in the marginal product of labor. It is also straightforward to incorporate cultural determinants of savings through the subjective rate of discount parameter. A large beta, representing perhaps a thrifty traditional society valuing next period's consumption heavily, would rotate the R^L curve up decreasing consumption and increasing worker investment for every level of capitalist investment. Such economies would enjoy a long period of investment by capitalists before demands for consumer credit begin to compete for investment funds. Conversely societies strongly affected by the "demonstration effect" or a low beta may find themselves short on savings early in the development process.

C. Policy Options

What policies are available to prevent such an offset? Clearly, a tax on wages to maintain them at present levels forever would remove the wage effect though it would seem at odds with the overall goal of raising incomes. Returning the taxes with interest at a later date would work only if agents could not borrow against these earnings in the capital markets. This seems to be the case in Singapore where social security taxes amount to a large fraction of earnings and can only be borrowed against in small amounts for housing purchases? [16] A subsidy on savings, or maintaining interest rates artificially high to counter the wage effect and fall in marginal product would shift both the R^L and R^K curve to the right, delaying, but never eliminating the offset or the eventual borrowing against future earnings by workers. Credit rationing seems a more direct approach but cannot attack the offset when the equilibrium falls to the left of B where labor still saves and is not borrowing. However, to the right of B where borrowing against future income occurs, a policy of restricting consumer credit forces consumers off their reaction function to where they must live within their means each period. From the earlier discussion of how savings fell with the release of borrowing constraints in Europe and the U.S., it is clear that such restrictions can be effective.

IV. CONCLUSIONS

Once the decision has been made to pursue a high growth strategy in spite of possible welfare losses to the current generation, the financial sector becomes an important tool for ensuring a compatible intertemporal allocation of investment resources. This is not to deny the importance of increased intermediation in unifying the returns on investment projects and promoting productive efficiency. Rather, we have argued that the "optimal" saving level may not be generated by an unrestricted market and we have demonstrated that there is a natural tendency toward lower savings rates as the accumulation process proceeds due to a "consumption crowding out" effect. Further, our

---

[16] Krause (1987).

model argues that if financial markets are liberalized when there exists a sizable pent up demand for consumer credit, a loss in investable resources may result that offsets increases in efficiency. These concerns about the impact of easier consumption smoothing with liberalization have thus far been addressed solely, and inadequately in the debate about whether market determined interest rates promote higher savings. Our analysis suggests that the issue is more complex and that retaining restrictions on consumer and mortgage borrowing would seem a prudent departure from complete liberalization of the financial sector.

V. REFERENCES

Barandiaran, Edgardo, "La Gran Recesion de 1982" in *Del Auge a La Crisis de 1982.* Instituto Interamericano de Mercados de Capital, ILADES-Georgetown, Santiago, Chile.

Bovenberg, A. Lans, "Why has US Personal Saving Declined?," *Finance and Development*, June 1990.

Bovenberg, A. Lans and Owen Evans, "National and Personal Saving in the United States: Measurement and Analysis of Recent Trends," *IMF Staff Papers*, Vol. 37, No 3., Sept. 1990.

Cargill, Thomas and Shoichi Royama, *The Transition of Finance is Japan and the U.S., A Comparative Perspective*, Hoover Press, 1988.

Corbo, Vittorio, "Reforms and Macroeconomic Adjustments in Chile during 1974-84," *World Development*,Vol. 13, No. 8, August, 1985.

David, P. A. and J. L. Scadding, "Private Savings: Ultrarationality, Aggregation, and 'Denisons's Law'," *Journal of Political Economy*, March/April 1974.

Dean, Andrew, Martine Durand, John Fallon and Peter Hoeller, "Saving Trends and Behaviour in OECD Countries," *OECD Economic Studies*, No. 14, Spring 1990.

Deaton, Angus, "Saving in Developing Countries: Theory and Review," Discussion Paper #144, Woodrow Wilson School, Princeton University, March, 1989.

Eyzaguirre, Nicolas, " La Deuda Interna Chilena: 1975-1985, in Carlos Massad and Roberto Zahler ed. *Deuda Interna y Estabilidad Financiera*, Vol. II, CEPAL, Grupo Editor Latinoamericano, Buenos Aires, 1988.

Feldman, R. A., *Japanese Financial Markets, Deficits, Dilemmas and Deregulation*, Cambridge, The MIT Press, 1986.

Fry, Maxwell, J., "Financial Development: Theories and Recent Experience," *Oxford Review of Economic Policy*, 5(4), Winter 1989.

Fry, Maxwell J., "Models of Financially Repressed Developing Economies," *World Development* 10, September 1982.

Fry, Maxwell J., "Savings, Investment, Growth and the Cost of Financial Repression," *World Development*, Vol. 8, April 1980.

Galbis, V., "Financial Intermediation and Economic Growth in Less Developed Countries: A Theoretical Approach," *Journal of Development Studies*, Vol. 13, No. 2, January 1977.

Greenwood, John G., "Financial Liberalization and Innovation in Seven East Asian Economies," in *Financial Liberalization in East Asia.*

Harris, Milton, *Dynamic Economic Analysis*, New York, Oxford University Press, 1987.

Krause, Lawrence B., Koh Ai Tee and Lee (Tsao) Yuan, *The Singapore Economy Reconsidered*, Institute of Southeast Asian Studies, 1987.

Lehmussaari, Olli-Pekka, "Deregulation and Consumption, Savings Dynamics in the Nordic Countries," *IMF Staff Papers*, Vol 37, No. 1, March 1990.

Lehmussaari, Olli-Pekka, "Why Saving Fell in the Nordic Countries, "*Finance and Development*, June 1990.

McKinnon, Ronald I., *Money and Capital in Economic Development*, The Brookings Institution, 1973.

Sakakibara, Eisuke and Robert Feldman, "The Japanese Financial System in Comparative Perspective," in *Journal of Comparative Economics*, 7, 1983.

Sargent, Thomas J., *Dynamic Macroeconomics*, Harvard University Press, Cambridge, MA, and London, England, 1987, Ch. 1.

Schmitt-Hebbel, Klaus, "Consumo e Inversion in Chile (1974-1983): Una Interpretacion'Real' del Boom," in *Del Auge a La Crisis de 1982.* Instituto Interamericano de Mercados de Capital, ILADES- Georgetown, Santiago, Chile. From Ph.D. dissertation, MIT, 1987.

Sen, Amartya, *Resources, Values and Development*, Harvard University Press, Cambridge, 1984.

Suzuki, Yoshio, *The Japanese Financial System*, Oxford, Clarendon Press, 1987.

Thaler, Richard H. and H. M. Shefrin, "An Economic Theory of Self Control," *Journal of Political Economy*, 1981, Vol. 89, No. 2.

Zahler, Roberto,. "Las Tasas de Interes en Chile: 1975-82," in *El Desarollo financiero de America Latina*, Instituto Interamericano de Mercados de Capital, 1985.

HECKMAN
BINDERY INC.
JUN 95
Bound-To-Please N. MANCHESTER, INDIANA 46962

UNIVERSITY OF ILLINOIS-URBANA
3 0112 060295885